


58th IWK

Ilmenau Scientific Colloquium
Technische Universität Ilmenau



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8 – 12 September 2014

»Shaping the Future by Engineering«



Department of
Mechanical Engineering


TECHNISCHE UNIVERSITÄT
ILMENAU

IMPRESSUM

Editor: The President of Technische Universität Ilmenau
Univ.-Prof. Dr. rer. nat. habil. Dr. h. c. Prof. h. c. mult. Peter Scharff

Dean of the Department of Mechanical Engineering
Univ.-Prof. Dr.-Ing. Christian Weber

Marketing Division
Andrea Schneider

Publisher: Universitätsbibliothek Ilmenau
[ilmedia](#)
Postfach 10 05 65
98684 Ilmenau

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URN: [urn:nbn:de:gbv:ilm1-2014iwk:3](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk:3)

PREFACE

Dear Conference Participants!

We are delighted to welcome you to Technische Universität Ilmenau for the 58th Ilmenau Scientific Colloquium (58. Ilmenauer Wissenschaftliches Kolloquium, IWK). The IWK looks back on almost 60 years of tradition in exchanging scientific ideas and bridging disciplines. In 2014, the Ilmenau Scientific Colloquium is again organised by the Department of Mechanical Engineering.

The title of this year's conference:

"Shaping the Future by Engineering"

points out that in our modern world technology and its creation by engineering is probably the most dominant driver in shaping the future of mankind – posing a great responsibility on engineers as the main actors. The Colloquium, complemented by workshops, is characterised by the following topics, but not narrowly limited to them:

- Precision Engineering and Precision Measurement Technology
- Mechatronics, Biomechatronics and Mechanism Technology
- Systems Technology.

The topics are those facets of Mechanical Engineering in which our own Department strives to excel, as a centre of both research and teaching. They are also part of the dedicated research strategy which Technische Universität Ilmenau as a whole has successfully defined as a strategic guideline. As always in the long series of IWK conferences, we have invited and encouraged contributions both from academia and industry.

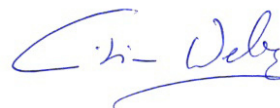
We are delighted with the response:

After careful international reviewing, more than 200 contributions remain for presentation, representing 15 contributing countries. The range of subjects certainly reflects the interdisciplinary nature of the conference topics and will bring together industrialists and scientists from a variety of disciplines.

The discussions during the IWK will doubtless be both wide and deep, both exciting and exhaustive, providing the material, we are sure, for further publications in the various respective subject-related journals. No matter whether you are an experienced professional or a novice in mechanical engineering – we are convinced that the 58th Ilmenau Scientific Colloquium will be of benefit to you. Besides a fruitful and interesting professional exchange of views, we wish you an enjoyable stay in the town of Ilmenau and its surroundings. Among other things, the town has close connections to Johann Wolfgang von Goethe who already 200 years ago appreciated its beauty and came back many times, both on business and for pleasure. Perhaps the 58th IWK will inspire you to follow in his footsteps!



Professor Peter Scharff
President of the Technische
Universität Ilmenau



Professor Christian Weber
Dean of the Department of
Mechanical Engineering

International Scientific Committee

These Papers were evaluated by the by the members of the *International Scientific Committee* in a peer review process.

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Topic 1: Precision Engineering and Precision Measurement Technology

Session 1.1 Nanopositioning and Nanomeasuring Technology

- [1.1.1] **Challenges in nanometrology: high precision measurement of position and size**
Bosse, Harald; Bodermann, Bernd; Dai, Gaoliang; Flügge, Jens; Frase, Carl Georg; Häßler-Grohne, Wolfgang; Köchert, Paul; Köning, Rainer; Weichert, Christoph
URN: [urn:nbn:de:gbv:ilm1-2014iwk-196:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-196:5)
- [1.1.2] **Self-volumetric error compensation of a developed Micro-CMM**
Fan, Kuang-Chao; Hsu, Shih-Hsin; Zhou, Hao
URN: [urn:nbn:de:gbv:ilm1-2014iwk-071:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-071:9)
- [1.1.3] **Application of the metrological SPM for long distance measurements**
Vorbringer-Dorozhovets, Nataliya; Füßl, Roland; Manske, Eberhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-158:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-158:6)
- [1.1.4] **Markers for referencing topography measurement data of optical surfaces**
Müller, Andreas; Mastyllo, Rostyslav; Vorbringer-Dorozhovets, Nataliya; Manske, Eberhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-152:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-152:9)
- [1.1.5] **Ongoing trends in precision metrology**
Manske, Eberhard; Füßl, Roland; Mastyllo, Rostyslav; Vorbringer-Dorozhovets, Nataliya; Birli, Oliver; Jäger, Gerd
URN: [urn:nbn:de:gbv:ilm1-2014iwk-156:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-156:0)
- [1.1.6] **Digital beat frequency control of an offset-locked laser system**
Köchert, Paul; Weichert, Christoph; Flügge, Jens; Wurmus, Jens; Manske, Eberhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-068:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-068:6)
- [1.1.7] **Scan performance of nanopositioning systems with large travel range**
Hesse, Steffen; Schäffel, Christoph; Zschäck, Stephan; Ament, Christoph; Müller, Andreas; Manske, Eberhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-069:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-069:6)
- [1.1.8] **Positioning with nanometre precision requires a high tech nanopositioning and nanomeasuring machine and an optimal machine setup**
Fiedler, Bernd; Gerlach, Erik; Husung, Isabel; Zeidis, Igor; Zimmermann, Klaus; Füßl, Roland; Manske, Eberhard; Hausotte, Tino; Theska, René
URN: [urn:nbn:de:gbv:ilm1-2014iwk-029:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-029:6)
- [1.1.9] **Challenges and trends in manufacturing metrology – VDI/VDE roadmap**
Imkamp, Dietrich; Gabbia, Alessandro; Berthold, Jürgen
URN: [urn:nbn:de:gbv:ilm1-2014iwk-104:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-104:7)

- [1.1.10] **Stability of a fully fibre-coupled interferometer**
Weichert, Christoph; Köchert, Paul; Köning, Rainer; Flügge, Jens
URN: [urn:nbn:de:gbv:ilm1-2014iwk-059:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-059:9)
- [1.1.11] **Signal interpolation method for quadrature phase-shifted Fabry-Perot interferometer**
Wang, Yung-Cheng; Shuyu, Lih-Horng; Chang, Chung-Ping; Manske, Eberhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-088:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-088:1)
- [1.1.12] **Field programmable gate array based digital lock-in amplifier for highest resolution heterodyne interferometer**
Strube, Sebastian; Molnar, Gabor; Danzebrink, Hans-Ulrich
URN: [urn:nbn:de:gbv:ilm1-2014iwk-200:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-200:3)
- [1.1.13] **High-resolution fiber-coupled interferometric point sensor for micro- and nano-metrology**
Schake, Markus; Schulz, Markus; Lehmann, Peter
URN: [urn:nbn:de:gbv:ilm1-2014iwk-176:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-176:5)
- [1.1.14] **Tidal earth crust deformation measurements**
Dontsov, Denys; Pöschel, Wolfgang; Schott, Walter; Kukowski, Nina; Jahr, Thomas; Schindler, Peter
URN: [urn:nbn:de:gbv:ilm1-2014iwk-090:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-090:0)
- [1.1.15] **Detection of subsurface damage in optical transparent materials using short coherence tomography**
Börret, Rainer; Wiedemann, Dominik; Kelm, Andreas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-199:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-199:0)
- [1.1.16] **A compact tactile surface profiler for multi-sensor applications in nano measuring machines**
Hofmann, Norbert; Mastylo, Rostyslav; Manske, Eberhard; Theska, René
URN: [urn:nbn:de:gbv:ilm1-2014iwk-177:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-177:3)
- [1.1.17] **Use of phase inversion points of the light field for angular displacement measurement**
Ivanov, Alexander Nikolaevich; Nosova, Maryana Dmitrievna
URN: [urn:nbn:de:gbv:ilm1-2014iwk-032:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-032:7)
- [1.1.18] **Tilted wave interferometer – improved measurement uncertainty**
Mühlig, Stefan; Siepmann, Jens; Lotz, Markus; Jung, S.; Schindler, Johannes; Baer, Goran
URN: [urn:nbn:de:gbv:ilm1-2014iwk-118:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-118:5)
- [1.1.19] **Combined optical sensor for 3D geometry and roughness measurement**
Büchner, Marco; Nehse, Uwe; Lotz, Markus; Uhlrich, Günter; Kühmstedt, Peter; Schröder, Sven; Hauptvogel, Matthias
URN: [urn:nbn:de:gbv:ilm1-2014iwk-116:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-116:0)
- [1.1.20] **Improvement of metrological characteristics of portable impedance analyzers**
Stadnyk, Bogdan; Fröhlich, Thomas; Khoma, Yuriy
URN: [urn:nbn:de:gbv:ilm1-2014iwk-132:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-132:4)

- [1.1.21] **Evaluation of stability of system with neural controller**
Hirnyak, Yu.; Ivakhiv, Orest; Nakonechnyi, M.; Repetylo, Taras
URN: [urn:nbn:de:gbv:ilm1-2014iwk-010:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-010:6)

Session 1.2 *Measurement and Sensor Technology*

- [1.2.1] **Thermovoltages under consideration of the thermal expansion**
Irrgang, Klaus
URN: [urn:nbn:de:gbv:ilm1-2014iwk-205:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-205:2)
- [1.2.2] **Review of the structure and the principle of work of nuclear quadrupole resonance thermometer**
Stadnyk, Bogdan; Volyskyi, Rostyslav
URN: [urn:nbn:de:gbv:ilm1-2014iwk-150:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-150:4)
- [1.2.3] **Metrological optimization of thermocouples for exhaust metering**
Garbers, Johannes; Gehrman, Stephan; Augustin, Silke; Fröhlich, Thomas; Irrgang, Klaus; Lippmann, Lutz
URN: [urn:nbn:de:gbv:ilm1-2014iwk-086:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-086:5)
- [1.2.4] **Insert with a multiple fixed-point cell for a dry block calibrator**
Marin, Sebastian; Hohmann, Michael; Schalles, Marc; Krapf, Gunter; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-114:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-114:4)
- [1.2.5] **Calibration of heat flux sensors with small heat fluxes**
Hohmann, Michael; Breitzkreutz, Paul; Schalles, Marc; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-101:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-101:4)
- [1.2.6] **Dual fiber-coupled laser hygrometer for fast in-situ gas analysis with *minimized absorption path length***
Klein, Alexander; Ebert, Volker
URN: [urn:nbn:de:gbv:ilm1-2014iwk-055:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-055:5)
- [1.2.7] **Characterization of non-dispersive infrared gas detection system for multi gas applications**
Silinskas, Mindaugas; Mikuta, Reinhard; Bourouis, R.; Kloos, Sven M.; Burte, Edmund. P.
URN: [urn:nbn:de:gbv:ilm1-2014iwk-054:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-054:7)
- [1.2.8] **Thin-film capable ceramics for humidity and temperature sensing applications**
Goj, Boris; Brokmann, Ulrike; Bartsch, Heike; Rädlein, Edda; Müller, Jens
URN: [urn:nbn:de:gbv:ilm1-2014iwk-047:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-047:3)
- [1.2.9] **Hygrostat based on adsorption processes controlled by a high precision chilled dew point mirror**
Rogge, Norbert; Engwicht, Mathias; Welsch, Steffen; Hilbrunner, Falko; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-122:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-122:7)

- [1.2.10] **New material standards for traceability of roundness measurements of large scale rotors**
Widmaier, Thomas; Kuosmanen, Petri; Hemming, Björn; Esala, Veli-Pekka; Brabandt, Daniel; Haikio, Janne
URN: [urn:nbn:de:gbv:ilm1-2014iwk-136:5](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-136:5)
- [1.2.11] **Force measurements by strain gauge sensors as part of time-of-flight flow rate control**
Dubovikova, Nataliia; Karcher, Christian; Resagk, Christian
URN: [urn:nbn:de:gbv:ilm1-2014iwk-109:8](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-109:8)
- [1.2.12] **Contact materials for mass artifacts**
Rahneberg, Ilko; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-146:3](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-146:3)
- [1.2.13] **Influence of the air buoyancy correction to the uncertainty of mass comparisons**
Hilbrunner, Falko; Fehling, Thomas; Mühlich, Sigo; Schreiber, Mario
URN: [urn:nbn:de:gbv:ilm1-2014iwk-107:0](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-107:0)
- [1.2.14] **Development of a force displacement measurement device for the determination of spring constants**
Diethold, Christian; Kühnel, Michael; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-092:6](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-092:6)
- [1.2.15] **Analysis, physically motivated modeling and system identification of electromagnetic force compensated balances (EMFC)**
Amthor, Arvid; Kaiser, Irina; Rogge, Norbert; Weiß, Heiko
URN: [urn:nbn:de:gbv:ilm1-2014iwk-124:2](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-124:2)
- [1.2.16] **New proposals for the dynamic tests of torque transducers**
Oliveira, Rafael S.; Lepikson, Herman Augusto; Bitencourt, Antonio Carlos Peixoto; Machado, Raphael R.; Winter, Simon; Theska, René; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-082:5](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-082:5)
- [1.2.17] **PC-based low latency controller for dynamic mechatronic systems**
Schwesinger, Folker; Krapf, Gunter; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-091:8](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-091:8)
- [1.2.18] **Dynamic characterization of a multi-component force transducer using a Lorentz force load changer**
Schleichert, Jan; Carlstedt, Matthias; Marangoni, Rafael; Rahneberg, Ilko; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-181:4](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-181:4)
- [1.2.19] **Application of a multi-degree-of-freedom sensor in local Lorentz force velocimetry using a small-size permanent magnet system**
Hernández, Daniel; Karcher, Christian; Thess, André
URN: [urn:nbn:de:gbv:ilm1-2014iwk-093:4](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-093:4)
- [1.2.20] **State standard of electrical resistance on the basis of von Klitzing constant**
Stadnyk, Bogdan; Yatsyshyn, Svyatoslav
URN: [urn:nbn:de:gbv:ilm1-2014iwk-149:8](http://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-149:8)

- [1.2.21] **Calibrating slender thermocouples oneself**
Lehmann, Harald
URN: [urn:nbn:de:gbv:ilm1-2014iwk-163:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-163:5)
- [1.2.22] **Capacitive sensor technology based on area variation for precise position detection**
Pufke, Michael; Hilbrunner, Falko; Diethold, Christian; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-161:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-161:9)
- [1.2.23] **High-precision analog interfaces for low-latency PC-in-the-loop controller**
Krapf, Gunter; Schwesinger, Folker; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-094:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-094:2)
- [1.2.24] **Dual axis tiltmeter with nanorad resolution based on commercial force compensation weigh cells**
Kühnel, Michael; Rivero, Michel; Diethold, Christian; Hilbrunner, Falko; Fröhlich, Thomas
URN: [urn:nbn:de:gbv:ilm1-2014iwk-098:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-098:3)

Session 1.3 Precision Engineering and Optics

- [1.3.1] **The influence of polarisation changes introduced by deflecting elements to interferometric measurements**
John, Kerstin; Theska, René; Manske, Eberhard; Büchner, Hans-Joachim
URN: [urn:nbn:de:gbv:ilm1-2014iwk-085:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-085:8)
- [1.3.2] **Approaches to cost-effective manufacturing of precision aspheres**
Scheibe, Hannes; Theska, René
URN: [urn:nbn:de:gbv:ilm1-2014iwk-080:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-080:9)
- [1.3.3] **The influence of the contact force in dilatometry : force-controlled measuring cells in dilatometry**
Wohlfahrt, Fabian; Theska, René
URN: [urn:nbn:de:gbv:ilm1-2014iwk-007:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-007:3)
- [1.3.4] **Imaging systems with Alvarez-Lohmann lenses**
Grewe, Adrian; Sinzinger, Stefan
URN: [urn:nbn:de:gbv:ilm1-2014iwk-167:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-167:5)
- [1.3.5] **Investigation on process induced nano scale shape deviations of DUV tungsten wire grid polarizer**
Siefke, Thomas; Voigt, Daniel; Puffky, Oliver; Kley, Ernst-Bernhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-083:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-083:2)
- [1.3.6] **Investigations on the damping properties of vacuum-compatible aerostatic journal gas bearing elements**
Heidler, Nils; Holub, Tobias; Risse, Stefan; Eberhardt, Ramona
URN: [urn:nbn:de:gbv:ilm1-2014iwk-061:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-061:2)
- [1.3.7] **Vectorial tolerances for the uncertainty analysis of precision measurement devices**
Geis, Annika; Husung, Stephan; Weber, Christian; Füßl, Roland; Manske, Eberhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-034:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-034:2)

- [1.3.8] **Refractivity compensated tracking interferometer for precision engineering**
Meiners-Hagen, Karl; Pollinger, Florian; Prellinger, Günther; Rost, Kerstin; Wendt, Klaus; Pöschel, Wolfgang; Dontsov, Denis; Schott, Walter; Mandryka, Viktor
URN: [urn:nbn:de:gbv:ilm1-2014iwk-119:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-119:6)
- [1.3.9] **Development of mirror cells for a satellite born solar telescope**
Bischoff, Jörg; Grauf, Bianca; Staub, Jan; Gandorfer, Achim; Woch, Joachim; Clark, S.; Zimmermann, Marcus; Kolb, A.; Metz, B.; Rucks, Peter
URN: [urn:nbn:de:gbv:ilm1-2014iwk-188:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-188:8)
- [1.3.10] **Adjustment and evaluation of incremental optical rotary encoders**
Smirnov, N. V.; Latyev, Svjatoslav M.; Theska, René
URN: [urn:nbn:de:gbv:ilm1-2014iwk-030:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-030:1)
- [1.3.11] **Concrete - future material for high precision machines**
Hahm, Christoph; Theska, René; Flohr, Alexander; Dimmig-Osburg, Andrea; Hartmann, O.
URN: [urn:nbn:de:gbv:ilm1-2014iwk-127:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-127:5)
- [1.3.12] **Miniaturized AMD vision aids: principles and realization**
Hillenbrand, Matthias; Mitschunas, Beate; Hoffmann, Daniela; Grewe, Adrian; Hinz, Susanne; Feßer, Patrick; Sinzinger, Stefan
URN: [urn:nbn:de:gbv:ilm1-2014iwk-165:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-165:0)
- [1.3.13] **Tilted Wave Interferometer - Design and Test**
Lotz, Markus; Siepmann, J.; Mühlig, Stefan; Jung, S.; Baer, Goran
URN: [urn:nbn:de:gbv:ilm1-2014iwk-117:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-117:8)
- [1.3.14] **Interferometrical determination of concentric run-out errors in rotary tables for optical roundness measurement**
Ullmann, Vinzenz; Kühnel, Michael; Manske, Eberhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-058:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-058:8)

Session 1.4 Image Processing and Quality Assurance

- [1.4.1] **Hyper- and multispectral imaging systems - a survey of different approaches at the Ilmenau University of Technology**
Rosenberger, Maik; Correns, Martin; Fütterer, Richard; Linß, Gerhard; Manske, Eberhard; Fröhlich, Thomas; Grewe, Adrian; Hillenbrand, Matthias; Sinzinger, Stefan
URN: [urn:nbn:de:gbv:ilm1-2014iwk-087:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-087:3)
- [1.4.2] **A self-optimizing framework for developing metrology software on massive parallel processor architectures**
Beier, Tobias
URN: [urn:nbn:de:gbv:ilm1-2014iwk-112:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-112:9)
- [1.4.3] **SICALT - spectral image correction and analysis tool**
Schwannecke, Hans-Christian; Fütterer, Richard; Rosenberger, Maik; Linß, Gerhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-197:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-197:3)

- [1.4.4] **Quality assurance with calibration tools for mobile smart photonic dimensional, color and spectral measurement systems**
Dittrich, Paul-Gerald; Höfner, Dieter; Kraus, Daniel; Hofmann, Dietrich
URN: [urn:nbn:de:gbv:ilm1-2014iwk-202:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-202:9)
- [1.4.5] **Quality assurance with spectrometer hardware apps for mobile smart photonic spectral measurements**
Kraus, Daniel; Dittrich, Paul-Gerald; Höfner, Dieter; Hofmann, Dietrich
URN: [urn:nbn:de:gbv:ilm1-2014iwk-203:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-203:7)
- [1.4.6] **Multichannel sorting of food based on image processing**
Brückner, Peter; Lemanzky, Thomas; Schlegel, Alexander; Weber, Günther
URN: [urn:nbn:de:gbv:ilm1-2014iwk-166:8](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-166:8)
- [1.4.7] **Acceleration of image restoration algorithms for dynamic measurements in coordinate metrology by using OpenCV GPU framework**
Holder, Silvio; Linß, Gerhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-140:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-140:6)
- [1.4.8] **Secret aspects of future engineering**
Nordhoff, Wilfried
URN: [urn:nbn:de:gbv:ilm1-2014iwk-192:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-192:3)
- [1.4.9] **Quality assurance with digital learning equipment for mobile smart photonic dimensional, color and spectral measurements**
Höfner, Dieter; Dittrich, Paul-Gerald; Kraus, Daniel; Hofmann, Dietrich
URN: [urn:nbn:de:gbv:ilm1-2014iwk-186:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-186:3)
- [1.4.10] **Extraction of the motion indications in the sequence of images**
Mitsiukhin, A.
URN: [urn:nbn:de:gbv:ilm1-2014iwk-075:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-075:0)
- [1.4.11] **Imaging sensor system with wireless data transmission for in-process measurements in the machining area of milling centers**
Schellhorn, Mathias; Preißler, Marc; Hoffmann, Rolf; Linß, Gerhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-133:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-133:2)
- [1.4.12] **Energy efficient light modulation for multispectral imaging**
Rosenberger, Maik; Rilk, Johannes; Fütterer, Richard; Lawin, Meike; Linß, Gerhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-102:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-102:1)
- [1.4.13] **Study of optimal algorithm for distance measurements in computer vision**
Costa, Pedro Bastos; Leta, Fabiana Rodrigues; Barros, Wellington Santos; Ribeiro, Michele Fernandes Lemos; Baldner, Felipe de Oliveira; Gomes, Juliana Freitas Santos
URN: [urn:nbn:de:gbv:ilm1-2014iwk-147:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-147:0)

Topic 2: Mechatronics, Biomechatronics and Mechanism Technology

Session 2.1 Mechatronic Systems

- [2.1.1] **Adaptive Kalman filter for active magnetic bearings using softcomputing**
Li, Li; Kästner, Wolfgang; Worlitz, Frank
URN: [urn:nbn:de:gbv:ilm1-2014iwk-031:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-031:9)
- [2.1.2] **Nonlinear Control of Complex Systems Using Algorithmic Differentiation**
Röbenack, Klaus; Winkler, Jan; Franke, Mirko
URN: [urn:nbn:de:gbv:ilm1-2014iwk-125:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-125:0)
- [2.1.3] **Symbolic derivation of control models for nonholonomic mechanical systems**
Sanjuan Szklarz, Paweł Cesar; Jarzebowska, Elzbieta
URN: [urn:nbn:de:gbv:ilm1-2014iwk-143:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-143:9)
- [2.1.4] **Mechatronic System for Bulldozer's Intellectual Control**
Bulgakov, Alexey; Tokamakov, Georgy
URN: [urn:nbn:de:gbv:ilm1-2014iwk-198:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-198:1)
- [2.1.5] **Complexity of mechatronic systems on example of mobile robots**
Schale, Florian; Braunschweig, Marion; Frank, Sebastian
URN: [urn:nbn:de:gbv:ilm1-2014iwk-001:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-001:6)
- [2.1.6] **A cascaded worm-like locomotion system - constructive design, software and experimental environment**
Gorges, Stephan; Riehs, Christopher; Zimmermann, Klaus; Kästner, Tobias
URN: [urn:nbn:de:gbv:ilm1-2014iwk-046:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-046:5)
- [2.1.7] **A whleg-axle-tracking mechanism for passenger transport purposes**
Köhring, Sebastian; Lutherdt, Stefan; Fremerey, Max; Witte, Hartmut
URN: [urn:nbn:de:gbv:ilm1-2014iwk-144:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-144:7)
- [2.1.8] **Dynamical behavior of window regulator systems**
Zhao, Xin; Petkun, Sergey; Zeidis, Igor; Zimmermann, Klaus
URN: [urn:nbn:de:gbv:ilm1-2014iwk-051:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-051:4)
- [2.1.9] **Low-cost piezoelectric actuators - analytical, numerical and experimental studies with a focus on mobile robotics**
Becker, Felix; Börner, Simon; James, Emmanuel; Minchenya, Vladimir; Zimmermann, Klaus
URN: [urn:nbn:de:gbv:ilm1-2014iwk-043:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-043:2)
- [2.1.10] **Automatization the 3D reconstruction of the building model using 2D images**
Bulgakov, Alexey; Evgenov, Alexey
URN: [urn:nbn:de:gbv:ilm1-2014iwk-002:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-002:4)
- [2.1.11] **Global descriptors application in object recognition**
Kupriyanov, Dmitry; Shvarts, Dmitry; Musalimov, Victor; Tamre, Mart
URN: [urn:nbn:de:gbv:ilm1-2014iwk-074:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-074:2)

[2.1.12] Energy efficiency measures for drive cooling system of a machine tool by use of physical simulation models

Kirchner, Henry; Rehm, Matthias; Quellmalz, Johannes; Schlegel, Holger

URN: [urn:nbn:de:gbv:ilm1-2014iwk-003:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-003:2)

[2.1.13] Fuzzy-adapted lane assist of vehicles with uncertainties

Noll, Andreas; Behn, Carsten

URN: [urn:nbn:de:gbv:ilm1-2014iwk-014:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-014:7)

[2.1.14] Pipeline inspection robot

Marangoni, Rafael R.; Baron, Raphael

URN: [urn:nbn:de:gbv:ilm1-2014iwk-171:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-171:7)

Session 2.2 Assistance Systems

[2.2.1] Regularity of dynamic visual acuity change in the training results

Rottc, Iuliia; Musalimov, Victor

URN: [urn:nbn:de:gbv:ilm1-2014iwk-006:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-006:5)

[2.2.2] An ear-pinna acoustic analysis coupled with an ear-canal emulator 711

Bances, Enrique; Schmidt, Tobias; Helbig, Thomas; Witte, Hartmut

URN: [urn:nbn:de:gbv:ilm1-2014iwk-159:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-159:6)

[2.2.3] Innovative Cooling and Compression System to Decrease Swellings on Fractures at Extremities

Päßler, Annekathrin; Nagel, Thomas

URN: [urn:nbn:de:gbv:ilm1-2014iwk-011:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-011:4)

[2.2.4] Whæg-module with electromagnetic spokes

Nassar, Omar; Fremerey, Max; Abdelhameed, Magdy M.; Tolbah, Farid A.; Witte, Hartmut

URN: [urn:nbn:de:gbv:ilm1-2014iwk-056:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-056:3)

[2.2.5] An approach to magnetically actuated miniaturized compliant locomotion systems

Kaufhold, Tobias; Böhm, Valter; Zeidis, Igor; Zimmermann, Klaus

URN: [urn:nbn:de:gbv:ilm1-2014iwk-110:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-110:4)

[2.2.6] Silver-Mobility - near field mobility concepts for the age group 50+

Lutherdt, Stefan; Becker, Felix; Brandl, Michael; Faenger, Bernd; Fränzel, Norbert; Fremerey, Max; Köhring, Sebastian; Lawin, Meike; Michaelis, Anne; Weichert, Frank

URN: [urn:nbn:de:gbv:ilm1-2014iwk-151:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-151:2)

[2.2.7] Risk perception of the elderly - analyzing the adoption of innovative mobility systems

Pezoldt, Kerstin; Michaelis, Anne

URN: [urn:nbn:de:gbv:ilm1-2014iwk-105:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-105:5)

- [2.2.8] **A description of the dynamics of a four-wheel Mecanum mobile system as a basis for a platform concept for special purpose vehicles for disabled persons**
Abdelrahman, Mohamed; Zeidis, Igor; Bondarev, Olga; Adamov, B.; Becker, Felix; Zimmermann, Klaus
URN: [urn:nbn:de:gbv:ilm1-2014iwk-041:7](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-041:7)
- [2.2.9] **Range estimation system for powered wheelchairs**
Fränzel, Norbert; Schroeder, Thekla; Weichert, Frank; Weiskopf, André; Wenzel, Andreas; Ament, Christoph
URN: [urn:nbn:de:gbv:ilm1-2014iwk-131:6](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-131:6)
- [2.2.10] **Control and Evaluation on Powered Assistive Systems for Standing-up Motion**
Iida, Chika; Suzuki, Ryoichi; Kobayashi, Nobuaki; Toyouchi, Atsushi; Toriyabe, Tatsuru
URN: [urn:nbn:de:gbv:ilm1-2014iwk-111:1](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-111:1)
- [2.2.11] **An attempt to objectively determine part of the key indicator method using the Kinect® camera**
Suzaly, Nuha; Nowack, Tobias; Sprenger, Sina; Kurtz, Peter
URN: [urn:nbn:de:gbv:ilm1-2014iwk-096:7](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-096:7)
- [2.2.12] **Combining learning classifier systems with the decision theory for creating a smart home system**
Döbel, Christian
URN: [urn:nbn:de:gbv:ilm1-2014iwk-138:0](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-138:0)
- [2.2.13] **Technical, non-visual characterization of substrate contact using carpal vibrissae as a biological model: an overview**
Schmidt, Manuela; Witte, Hartmut; Zimmermann, Klaus; Niederschuh, Sandra; Helbig, Thomas; Voges, Danja; Husung, Isabel; Volkova, Tatiana; Will, Christoph; Behn, Carsten
URN: [urn:nbn:de:gbv:ilm1-2014iwk-175:8](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-175:8)
- [2.2.14] **Quasi-static object scanning using technical vibrissae**
Will, Christoph; Steigenberger, Joachim; Behn, Carsten
URN: [urn:nbn:de:gbv:ilm1-2014iwk-015:5](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-015:5)
- [2.2.15] **Transversal vibrations of beams in context of vibrissae consisting of foundations, discrete supports and various sections**
Baldeweg, Daniel; Will, Christoph; Behn, Carsten
URN: [urn:nbn:de:gbv:ilm1-2014iwk-081:7](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-081:7)
- [2.2.16] **A joint with tunable compliance for a change of locomotion patterns**
Fremerey, Max; Witte, Hartmut
URN: [urn:nbn:de:gbv:ilm1-2014iwk-038:3](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-038:3)
- [2.2.17] **Contribution to snake-like locomotion: mechanical and mathematical models**
Heinz, Leo; Krüger, Martin; Behn, Carsten
URN: [urn:nbn:de:gbv:ilm1-2014iwk-013:9](http://nbn-resolving.org:urn:nbn:de:gbv:ilm1-2014iwk-013:9)

- [2.2.18] **Spy bristle bot - a vibration-driven robot for the inspection of pipelines**
Becker, Felix; Börner, Simon; Kästner, Tobias; Lysenko, Victor; Zeidis, Igor; Zimmermann, Klaus
URN: [urn:nbn:de:gbv:ilm1-2014iwk-042:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-042:4)

Session 2.3 Mechanism Technology

- [2.3.1] **Considering the design of the flexure hinge contour for the synthesis of compliant linkage mechanisms**
Linß, Sebastian; Milojević, Andrija; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-033:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-033:4)
- [2.3.2] **Characterization of the elasto-kinematic behavior of generalized cross-spring bearings**
Gonçalves, Luis Antonio; Bitencourt, Antonio Carlos Peixoto; Theska, René; Lepikson, Herman Augusto
URN: [urn:nbn:de:gbv:ilm1-2014iwk-135:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-135:7)
- [2.3.3] **Characteristics of a compliant fluid-mechanical actuator for creating a screw motion - comparison of simulation and measurement results**
Griebel, Stefan; Feierabend, Martin; Bojtos, Attila; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-009:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-009:1)
- [2.3.4] **Adaptive compliant gripper finger with embedded extending actuators**
Milojević, Andrija; Pavlović, Nenad D.; Pavlović, Nenad P.
URN: [urn:nbn:de:gbv:ilm1-2014iwk-121:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-121:9)
- [2.3.5] **Approaches on material analysis and modeling of bouncing putty**
Hartmann, Lars; Reich, René; Kletzin, Ulf; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-048:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-048:1)
- [2.3.6] **Hammering beneath the surface of Mars - modeling and simulation of the impact-driven locomotion of the HP 3 -Mole by coupling enhanced multi-body dynamics and discrete element method**
Lichtenheldt, Roy; Schäfer, Bernd; Krömer, Olaf
URN: [urn:nbn:de:gbv:ilm1-2014iwk-155:2](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-155:2)
- [2.3.7] **Measurement tools and strategies to improve stability in metal cutting**
Bendahhou, Abdessamad; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-057:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-057:0)
- [2.3.8] **Modeling and investigation of spring clip mechanisms and applications in precision engineering**
Hartmann, Lars; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-113:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-113:7)
- [2.3.9] **Analysis of supports of a three-legged compliant snap-through structure for application in an excess flow valve**
Hartmann, Lars; Opfermann, Ronald; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-049:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-049:1)

- [2.3.10] **Specific curvature behavior of compliant mechanism with hydraulic activation used for medical instruments or implants**
Issa, Mirna; Hügl, Silke; Rau, Thomas S.; Majdani, Omid; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-129:3](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-129:3)
- [2.3.11] **Sensor elements made of conductive silicone rubber for a compliant gripper**
Issa, Mirna; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-130:9](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-130:9)
- [2.3.12] **Compliant shear force sensor**
Chaykina, Alexandra; Griebel, Stefan; Zentner, Lena
URN: [urn:nbn:de:gbv:ilm1-2014iwk-017:0](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-017:0)
- [2.3.13] **Optimal design of adaptive compliant mechanisms with inherent actuators comparing discrete structures with continuum structures incorporating flexure hinges**
Milojević, Andrija; Linß, Sebastian; Zentner, Lena; Pavlović, Nenad T.; Pavlović, Nenad D.; Petrović, Tomislav; Milošević, Miloš; Tomić, Miša
URN: [urn:nbn:de:gbv:ilm1-2014iwk-141:4](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-141:4)

Topic 3: Systems Technology

Session 3.1 Components, Systems and Processes

- [3.1.1] **Competition of innovation – realization by „Consistent R&D“**
Lasch, Thorsten
URN: [urn:nbn:de:gbv:ilm1-2014iwk-005:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-005:7)
- [3.1.2] **Concept of modelling the Failure Mode Effects Analysis (FMEA) on the base of Characteristics-Properties Modelling (CPM)**
Crostack, Alexander; Binz, Hansgeorg; Roth, Daniel
URN: [urn:nbn:de:gbv:ilm1-2014iwk-021:1](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-021:1)
- [3.1.3] **Design for quality in the concept generation phase of the product design process**
Arunachalam, Ramanathan; Zahid Qamar, Sayyad; Said Al Shidhani, Ahmed; Saud Al Musallami, Ali; Saif Al Hadrami, Mohammed
URN: [urn:nbn:de:gbv:ilm1-2014iwk-077:6](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-077:6)
- [3.1.4] **An approach for a model based development process of cybertronic systems**
Eigner, Martin; Muggeo, Christian; Dickopf, Thomas; Faißt, Karl-Gerhard
URN: [urn:nbn:de:gbv:ilm1-2014iwk-145:5](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-145:5)
- [3.1.5] **Development of working structures with a focus on lightweight design**
Posner, Benedikt; Binz, Hansgeorg; Roth, Daniel
URN: [urn:nbn:de:gbv:ilm1-2014iwk-023:7](https://nbn-resolving.org/urn:nbn:de:gbv:ilm1-2014iwk-023:7)
- [3.1.6] **Design and FE calculations of a lightweight civil unmanned air vehicle**
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[WS.2.1] Human factors in IVE development - a case study for virtual fear of public speaking training

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[WS.2.2] Simulation of acoustical properties of technical systems using a network-based sound-server

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[WS.2.3] Determination of the near-field-acoustics of primary vehicle sound sources in relation to indoor pass-by noise testing for the verification of a virtual acoustic vehicle model

Albers, Albert; Landes, David; Behrendt, Matthias; Weber, Christian; Siegel, Antje; Husung, Stephan

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[WS.3.2] Design of a phase-shifting double-wheg-module for quadruped robots

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- [WS.3.3] **The cilia field as a paragon for technical macro transport**
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